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# Forests and poverty: how has our understanding of the relationship been changed by experience?

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## SUMMARY

Understanding of the relationship between forests and the poor has grown enormously, especially in the last twenty years. Aid donors worked on poverty reduction in the forest sector in the 1990s and into the early 2000s, but thereafter broadened their attention to address climate change mitigation, better forest governance and timber legality, and payments for environmental services. There has so far been an incomplete integration of new insights into the nature of poor people's reliance on forests, of their own efforts to use that reliance to escape from poverty, and of current forestry aid concerns. Future projects need to choose interventions which make better use of the results now available about forest-poverty relationships, both for the better conservation of forests, and for better focus on the livelihoods of the forest-reliant poor as they continue to try to move out of poverty.

Keywords: forests, poverty, forest reliance, non-cash income, livelihood resilience

## Forêts et pauvreté: comment notre compréhension de cette relation a-t-elle été changée par l'expérience?

G. SHEPHERD, K. WARNER et N. HOGARTH

La compréhension de la relation entre les forêts et les personnes démunies s'est énormément accrue, particulièrement au cours des vingt dernières années. Les donateurs d'aide se sont occupés de la réduction de la pauvreté dans le secteur forestier dans les années 90 et ce, jusqu'au début des années 2000, mais ils ont par la suite élargi leur attention à l'atténuation du changement climatique, à une gestion forestière et une légalité du bois meilleures et au paiement des services environnementaux. Jusqu'à présent, il n'y a eu qu'une intégration incomplète des nouvelles découvertes quant à la nature de la dépendance des démunis sur les forêts, leurs efforts personnels pour utiliser cette dépendance comme une échappatoire à la pauvreté et les soucis actuels de la foresterie. Les projets futurs doivent choisir des interventions faisant un meilleur usage des résultats actuellement disponibles sur les relations de pauvres avec la forêt, pour assurer non seulement une meilleure conservation de cette dernière mais aussi pouvoir se concentrer plus finement sur les revenus des pauvres dépendant de la forêt, alors qu'eux-mêmes continuent de s'efforcer de pouvoir échapper à l'indigence.

## Los bosques y la pobreza: ¿cómo ha cambiado la experiencia nuestra comprensión de la relación entre ambos?

G. SHEPHERD, K. WARNER y N. HOGARTH

La comprensión de la relación entre los bosques y la pobreza ha aumentado enormemente, especialmente en los últimos veinte años. Los donantes de ayuda humanitaria se han esforzado por reducir la pobreza en el sector forestal en la década de 1990 y a principios de la década de 2000, pero posteriormente ampliaron sus objetivos para abordar la mitigación del cambio climático, la mejora de la gobernanza forestal y la legalidad de la madera, así como los pagos por servicios ambientales. Hasta ahora se ha producido una integración incompleta de las nuevas percepciones sobre la naturaleza de la dependencia de los bosques que tienen las personas que se encuentran en situaciones de pobreza, de sus propios esfuerzos por utilizar esa dependencia para escapar de la pobreza y de las actuales preocupaciones sobre la ayuda al sector forestal. Los proyectos futuros deberían preferir las intervenciones que puedan aprovechar mejor los conocimientos disponibles en este momento sobre las relaciones entre bosques y pobreza, tanto para una mejor conservación de los bosques como para centrarse mejor en los medios de subsistencia de las personas en situaciones de pobreza que dependen de los bosques mientras siguen tratando de salir de esa situación.

## INTRODUCTION

The last 40 years has seen a slow evolution in understanding of the relationship between forests and the poor. Looking back at the 1978 Forest Sector paper (World Bank 1978) – one of whose lead authors was John Spears – it can be seen that though there was an ambition to address people's needs, poverty itself was not mentioned. The issues it focused on were fuelwood and timber production, shelterbelts, fodder, and the planting of fruit trees. Tenure and market access were mentioned as barriers to on-farm or small-scale forest production.

The paper was framed by two prior trends. Until then, forestry's most recent developing country investments had been in plantations. At the same time, the oil price rises of the early 1970s suggested that people in developing countries might be relying on woodfuel for their energy needs for some time to come. The obvious answer seemed to be programmes in which rural people grew fuelwood plantations to meet their needs, and thereby plugged a rapidly widening 'fuelwood gap' (Shepherd 1990).

FAO first addressed 'community forestry' in 1978 at which point it meant community woodlots for fuel and small timber (Arnold and Persson 2009). Early efforts in South Korea, Thailand and India quickly showed that farmers preferred on-farm trees to woodlots, however, and sought a much wider range of products than fuelwood and poles (Arnold 2001a). In 1985 the first Common Property Resource Management conference was held (NAS 1985), gathering together examples of the communal management of natural forests in Nepal, South India, Niger and Thailand among others. Donor support began to be sought also for the involvement of rural people in the management of existing forests (Hobley 1991).

The application of rural development participatory methods to forest management and tree-planting was new to foresters, and the first steps taken were towards people-focussed rather than poverty-focussed forestry. CIFOR (the Center for International Forestry Research) was established in 1993, following the Rio Earth Summit, to take an approach to forests that combined social, economic and environmental concerns and recognised that forests should be managed for broader societal values than timber alone.

In its opening section, the paper sets out what has been learned about the forest reliant poor over the last decade or more. Thereafter it examines a range of donor interventions which have attempted to address the relationships between forests and the poor, followed by a section on actions the forest-reliant poor themselves have undertaken to move out of poverty. It concludes with recommendations for the future.

## FOCUSSING ON THE POOR

During the 1990s, many multilateral and bilateral donors adopted poverty reduction as their primary overall aid objective, and sought to apply it, and better governance, to the forest sector among others (Brown *et al.* 1999, Arnold 2001a).

From around 2000 there began an outpouring of research into the poor and their use of forests (Wunder 2001, Angelsen and Wunder 2003, Vedeld *et al.* 2004, for instance) which led to the work of the CIFOR Poverty Environment Network (PEN). Substantial comparative research on commercial non-timber forest products (NTFPs) was also undertaken which explored, and was forced to reject, the hypothesis that the poor might be able to use them as a way out of poverty (Kusters and Belcher 2004, Sunderland and Ndoye 2004, Arnold 2004, Belcher *et al.* 2005). A further important cluster of papers on forests and poverty appeared in 2020 in a special issue of World Development (Miller and Hajjar 2020).

Around 1.6 billion people depend in part on forests for their livelihoods, including 70 million indigenous people (SDG website), forest dependency being defined as the share of absolute household income (including cash and subsistence), or the "relative income", that is derived from forest resources (Mamo *et al.* 2007, Kamanga *et al.* 2009). Forest-based contribution to livelihoods are defined as any product collected from a forest, or from trees. These include timber and non-timber forest products, whether tree, plant or animal-based.

## Where are the forest dependent poor?

The relationship between chronic poverty (where an individual or group is in a state of poverty – lacking sufficient material possessions or income – over an extended period of time) and remoteness was first researched by the Chronic Poverty Research Centre (Bird *et al.* 2002, CPRC 2004). Since then papers by Sunderlin *et al.* (2005, 2007, 2008) have examined spatial aspects of the forests-poverty link at a district to national-level scale in several countries. Other research has investigated poverty increases in 23 landscapes at a much more local intra-landscape level over just a few kilometres (Shepherd 2012).

Sunderlin *et al.* explained (2008) that the highest incidence of poverty (the proportion of poor people in an area) was to be found in the most remote and forested areas, a pattern repeated again and again wherever there is the data to show the relationship between poverty and forests (Hulme and Shepherd 2003, Kanbur and Venables 2005, Müller and Senf 2010). High poverty rates are found not only in remote high forest cover areas, but also in remote areas where forest is present but at much lower crown cover levels (Shepherd *et al.* 2012).

Those in remote areas are more likely to be chronically poor, while those closer to markets and roads are more likely to be the transient poor (who dip in and out of poverty) and the non-poor. As Chomitz remarks (2007, p71) travelling away from towns into rural areas is like travelling back in time: the further you go, the poorer people are, and the conditions you see today in remote rural areas are those of yesterday in now market-accessible areas.

## Unpacking forest reliance

CIFOR's Poverty Environment Network (PEN) study used standardized definitions and methods to quantify the contribution of forest and environmental income (including

the cash-equivalent value of subsistence extraction and production) in rural livelihoods across 24 developing countries. Detailed socioeconomic data was collected from nearly 8,000 households in 333 villages, making it the largest quantitative, global-comparative research project on the topic (Angelsen *et al.* 2014).

One of the key results from the analyses is the now much-cited average figure of around 22% for the average household forest income share, most of which comes from natural forests (Angelsen *et al.* 2014). There are however, large variations within this aggregate figure, both across and within regions. Hogarth *et al.* (2013) cite a figure of 31% for an area of Southern China. IUCN data (Table 2 below) shows a range from 9th to 59%. Wood fuels – predominantly firewood but also charcoal – are the most important products, accounting for about 35% of forest income and representing about 7.8% of total household income. The second-most important product category is food (around 30%), which includes wild fish and bush meat, as well as wild fruits, vegetables, and mushrooms. The third most important category is timber, poles and fibre products for house construction and domestic equipment, which make up about 25% of forest income. The fourth category (around 5%) is made up of forest medicines, resins and dyes.

Forest and environmental income proportions are higher for low-income households, but differences across wealth classes proved less-pronounced than previously assumed. Forest income is approximately five times higher in the higher income households compared to the lowest income households. Low-income households tend to rely more heavily on subsistence forest products such as wood fuels and wild foods by contrast with higher income households (Sunderland *et al.* 2014).

Previous assumptions about men, women and product use were challenged by some of the results from the PEN study. Men generated at least as much forest income as women, though Sunderland *et al.* (2014) found significant gender differentiation in the products collected. However, men do play a much more important and diverse role in the contribution of forest products to rural livelihoods than previously reported. Researchers did not find that environmental income is more important to households that are female headed (Angelsen *et al.* 2014).

### **The role of forest income within overall livelihood incomes**

Certain broad patterns about the relationship between cash and non-cash income also emerged from the 23 landscapes in which IUCN's 'Livelihoods and Landscapes' programme worked from 2006–2010. Firstly, non-cash income continues to be drawn from forests even where there are no cash sales of forest products at all. Secondly, forest non-cash values make a larger contribution to overall household income than do forest cash values in almost every case. Where cash values are high, because there are high-value forest products to sell, the ratio of cash to non-cash forest income is about 1:2. Where – the more usual case – these cash values are lower, the ratio rises to 1:3, 1:4 or more (Shepherd 2012).

IUCN and CIFOR results showed that men tended to sell a third or more of what they collected with the remainder going to the household, while women sold no more than 20 to 25% of what they collect. Forest products are often collected as a side-line while other more mainstream economic activities are underway. So, men may collect food or medicinal products from remote areas as part of a hunting expedition, while women collect fuelwood and wild foods while working on agricultural plots. Fuelwood, building materials, and forest foods were the most important contributors to both cash and non-cash income; but for consumption only, other items such as fibre and herbal medicine also scored high (Shepherd 2012, Sunderland *et al.* 2014).

### **The importance of recognising non-cash reliance on forests**

The fundamental importance of forests for the poor was sometimes underplayed in earlier work (Angelsen and Wunder 2003, Cavendish 2003) precisely because the contribution of cash from forest products to overall cash income is often very small. Where villagers are living on a total cash equivalent of under \$2.00 a day, the small fraction of that drawn from forest is nugatory and will certainly not make much contribution to an exit from poverty. There was also an assumption, (before the CIFOR PEN study results came in) that the non-cash component of forest income played no more than a safety net or gap-filler role (Wunder 2001, Wunder *et al.* 2014).

Cash income from forest sales was recorded in household budget surveys, living standards surveys and the like. But, until recently, forest non-cash income was not being systematically recorded anywhere. As a result, the constant and profound reliance on forests of local people was under-observed by both Bureaux of Statistics and Forestry Departments in government, and in consequence greatly undervalued (Agrawal *et al.* 2013). Attempts are now being made to rectify this (Bakkegaard *et al.* 2016, Bakkegaard *et al.* 2017), but a recent systematic map on the subject shows that assessments of poverty in forests are still very over-reliant on assumptions about the cash value of forests (Cheng *et al.* 2019).

### **MAJOR FOREST POLICY AND PROJECT INTERVENTIONS THAT IMPACT UPON THE POOR**

When forest management interventions involving local people were first devised, there was no doubt that forests were being prioritized over people. The focus was on lowering deforestation and degradation. Forest-based benefits for the poor and poverty reduction took second place. Indeed, early assumptions about local people who lived near forests showed a lack of trust. It was assumed that they were responsible for much deforestation, and that granting them greater rights or greater benefits might increase the deforestation rate (Arnold 2001a, 2001b, Arnold and Persson 2009). In-depth research on the main drivers of deforestation (Curtis *et al.* 2018) in due course suggested otherwise.



Others hypothesized that it was the lack of recognized rights of access and use by rural communities that led to local deforestation. So, logically, if rights to manage or protect a forest area were granted and communities could retain a portion of the forest products from their forest, deforestation and degradation would be reduced, along with poverty (Jagger *et al.* 2014).

### **Community-based forestry (CFM) and, community forest enterprises (CFEs)**

**Community forestry (CFM)** worked from the outset on the assumption that, handed some forest rights and some access to forest products, communities would be willing to invest their labour, and forego or postpone harvesting to encourage forest restoration.

While community forestry appealed to donors, it was less popular with forestry departments, which often employed various tactics to retain control. Officials were sceptical of the ability of communities to manage forests, and found the change in roles from policing to local support challenging. More broadly, the higher the potential marketed benefits from community forestry, the greater the hostility of the policy environment towards community management. Such issues were reported regularly in research undertaken in Nepal, East Africa and Cameroon (Brown *et al.* 2002, Pokorny and Johnson 2008, McDermott and Schreckenberg 2009).

In Nepal, rural communities are granted access to a forest area and must agree an Operational Plan stipulating what can be harvested and how the products/benefits are to be shared within the village (including percentages for the poor), and with the forestry department (Hobley 1996). While community forestry has improved the livelihoods of rural people (Hobley *et al.* 2012), commitment to special help for the poor has often been lacking. (Thoms 2006, Parajuli *et al.* 2015). Nevertheless, Oldekop *et al.* (2019) conclude, using high-resolution forest cover change data and near complete information on Nepal's 18,000 community forests, that community forest management (CFM) has contributed to significant net reductions in both poverty and deforestation. Reduced deforestation is lower where poverty levels are high, and higher where community forests are larger and have existed for longer, suggesting that additional support will be needed in poorer areas to minimise trade-offs between socio-economic and environmental outcomes.

A comparative review of cases from Asia, Latin America and Africa conducted by Baynes *et al.* (2015) confirms that the success of community forestry turns on good governance within the community forestry group, relatively secure tenure rights, genuine government support and a reliable stream of shorter and longer term benefits for members, findings also noted by others (Warner 2006, Anderson *et al.* 2015, Shyamsundar *et al.* 2018). None of these factors necessarily reduce poverty.

But McDermott and Schreckenberg (2009) contend that the poor do, nevertheless, benefit from community forestry. It both expands decision-making spaces for the community, and enlarges benefits at the supra-community level (through

national policy reform) providing opportunities to challenge factors perpetuating poverty.

**Community forest enterprises (CFEs)** face challenges similar to those encountered in CFM. A summary of the main findings from six key sources – largely concurring about CFE issues and challenges – is instructive. (Arnold 2001b, Stoian *et al.* 2009, Macqueen 2013, Foundjem-Tita *et al.* 2018, Hajjar and Oldekop 2018, Adhikary *et al.* 2019).

- The resource upon which the enterprise is based has to be adequate to generate sufficient benefit flows for enterprise participants to feel its management is worthwhile (Dolsak and Ostrom eds 2003). Reliable tenure rights are important.
- Long-term donor or NGO support is critical: CFEs may take years to mature and almost all begin with low levels of productivity and product quality, because they lack processing, management, and business administration skills. Occasionally private sector partnerships (e.g. Foundjem-Tita *et al.* 2018) provide this support.
- Government legal and regulatory frameworks hinder CFE development. Regulations developed for larger formal organisations, need recasting for small-scale operations, but this is slow to happen. The time and costs involved in negotiating regulatory bureaucracy are beyond the capacities of most CFEs, and as a result many choose instead to operate in an informal unregulated manner.
- Government service delivery is often weak, and unable to offer help with market development or even effective forest management.
- Many country governments try to control forest product trade in ways that hamper small producers. Forest departments often look for a share of product value.
- CFEs themselves are torn between the desire to distribute profits to members and the need to reinvest in the enterprise. It is often expected that CFE cash will provide social welfare benefits such as schools and health centres, and members may expect employment as well.
- The participation of women in CFEs is often low, and there is a risk that wealthier CFE members capture a disproportionate percentage of benefits.

Experience suggests, then, that while community forest enterprises have generated some benefits, poverty reduction has been modest.

### **FLEGT AND VPAS**

There is a commitment to poverty reduction in the FLEGT (Forest Law Enforcement, Governance and Trade) action plan and VPAs (Voluntary Partnership Agreements) which accompany it (European Commission 2003). The VPA has social safeguard instruments inbuilt to understand, prevent, and mitigate adverse effects of VPAs on livelihoods and one early proposal was to conduct a Poverty Impact Assessment before

VPA negotiations begin and to use the PIA to track effects on the poor. (Hobley and Buchy 2013).

But the realities of forest use and competing forest conceptions are perhaps too complex for a PIA. Owusu *et al.* (2010) in Ghana, (cited by Buchy and Hobley 2018) noted that while a VPA could in theory improve forest conditions, legalise small-scale forest activities and enhance local rights, more realistically the effects would likely be negative. They would include less employment in and income from 'illegal' logging; the denial of customary forest use-rights; a ban on small-scale technologies such as chainsaws; the enforcement of anti-poor aspects of forest laws; a focus on the technical at the expense of benefit sharing, and the empowerment of government bureaucracy at the expense of wider concepts of justice.

Originally VPAs were concerned only with the export of timber to European markets, but as regional and domestic markets grew these were included under the VPA, and the same legality framework was enforced for both export and domestic timber. This has imposed crushing regulatory barriers on small forest enterprises (Buchy and Hobley 2018)

Derous and Verhaeghe (2019) argue that the impact of formalising access to resources for vast numbers of actors in the grey zone between legality and illegality, and who depend on the forest for their livelihoods, has not been taken sufficiently seriously. They point out that forests are governed by a wide range of types of governance including customary systems, but that if there has been no reference to these traditional systems, VPAs turn local actors into criminals. Other writers concur that indigenous peoples have found it difficult to engage in these processes everywhere (Lesniewska and McDermott 2014, Setyowatia and McDermott 2017).

In their analysis of the Indonesian VPA, van Heeswijk and Turnhout, (2013), set out two interpretations of 'legality', with one more narrowly focused on law enforcement and a strong role for the state, and the other having a broader focus on issues of participation and sustainability. Both EU and Indonesian officials chose the narrower focus. If this is how debates in other VPA countries have gone, ambitions for poverty reduction through FLEGT and VPAs look unlikely to be realised.

### Protected areas

Around 1.6 billion people rely on forests, and of these an estimated 40 percent of the extreme rural poor – around 250 million people – live in relatively remote forest and open woodland savannah areas (FAO 2018). It is also the more forested of these same remote areas that are of interest to conservation and forest carbon initiatives. For households here to move out of poverty to relative prosperity 'is likely to be a slow, even inter-generational, process' (Shyamsundar *et al.* 2018). And for people who have very little, even minor setbacks or mistakes can undermine a slow improvement in livelihoods (Banerjee and Duflo 2011). Protected areas (PAs) create major additional hurdles for chronically poor households in remote areas, if they remove access to assets without providing compensating benefits.

After World War 2 there was an expansion of conservation initiatives by international organizations and donors into developing countries which chose a form of conservation premised on the ideal of people-free landscapes (Dressler *et al.* 2010). At a time when professionals in the forest sector were encouraging communities to play an active role in forest restoration through community forestry and forest co-management, conservation bodies were still locking them out of forests and criminalizing customary use (Neumann 2002).

Some protected area (PA) managers began to try to integrate conservation and development from the 1980s and 1990s onwards (Dressler *et al.* 2010) by managing both the PA and its buffer zone as one, combining strict protection within the PA with modest development opportunities in the buffer zone. The premise of these integrated conservation and development (ICDP) projects, as they were initially known, was that by providing communities living in biodiversity-rich areas with income-generating opportunities, compensation would be provided for loss of access to natural resources and these would become easier to protect (McShane and Wells 2004, Weber *et al.* 2011).

The term ICDP is now less often heard, superseded by what are nowadays referred to as Alternative Livelihoods projects (Roe *et al.* 2015). But earlier weaknesses tended to flow on into them. There was poor understanding that in the remote areas where most PAs were located, market opportunities were scant and forest reliance profound. The assumption that cash from income generation could almost entirely replace resources foregone was naïve in many ways. For instance, Table 1, drawing on results from a study in Uganda, shows that here, as elsewhere, many natural resources cannot be substituted for. Cash sales from natural resource products – which might hypothetically be replaced by other income sources – are insignificant beside the volumes of products used for home consumption, for which there is no alternative. The remoter the area, the truer this is (Shepherd 2012).

There was also failure to accept that local resource users might have only minor impacts on local biodiversity compared with those of commercial or government initiatives (Garcia-Amado *et al.* 2013). Above all, the benefit – if any – of alternative livelihood interventions to conservation outcomes was profoundly unclear (Sayer *et al.* 2007, Weber *et al.* 2011). A Systematic Review of alternative livelihood projects was undertaken by Roe *et al.* in 2015 to try to illuminate this issue with better evidence. Hundreds of such projects were screened and about 100 of them were reviewed in more detail, only 21 containing sufficient data to say whether positive, neutral, or negative outcomes were obtained. Projects had usually failed to put in place measures to monitor progress towards improved conservation status, for instance. The influence of the external economic environment was barely taken into account in assessing results, even where it was considerable – such as road construction or commodity price changes. In short it was impossible to identify potential success factors from the data. The Review's recommendations included developing a solid Theory of Change, and monitoring against its assumptions, and also recommended much more consultation with local stakeholders about potentially attractive interventions (Roe *et al.* in 2015).

TABLE 1 *Cash and non-cash income in percentage terms from eight villages in Uganda*

Forest Products	Cash %	Non-cash %	How much more important are products for non-cash use than for cash use?
Fuel	10.1	29.5	3 times as important
Building materials	8.6	16.3	Twice as important
Forest foods	6.0	12.7	Twice as important
Fibre (for ropes, mats, baskets etc)	1.7	6.4	4 times as important
Herbal medicine	1.1	3.6	Over 3 times as important
Timber	0.8	3.2	4 times as important
Percentage split between cash and non-cash	28.3	71.7	100%

Source: Shepherd, Kazoora and Muller, 2012, Table 9 p. 55

Some Systematic Review authors pushed analysis further in a separate article (Wright *et al.* 2015). Firstly, they recommended more nuanced analysis of which activities within livelihood strategies might be environmentally damaging and which not. Secondly, and very long overdue, they recommended abandoning the assumption of a homogeneous community, to investigate which households in the community caused the greatest negative environmental impact, and which were rendered especially vulnerable by resource access restrictions. Finally, they suggested abandoning the phrase ‘Alternative Livelihoods’ altogether and replacing it with ‘Livelihood Focused Interventions’ to avoid the assumption that alternatives actually exist. (Wright *et al.* 2015).

Far too few initiatives have attempted to work closely with local people from the start, however. Research undertaken by Sheil *et al.* (2006) suggested a very different approach. Working in East Kalimantan, the team partnered with local people to document locally valued habitats, species and sites, and their significance; to clarify threats and suggest management options, and to list issues requiring further investigation. Community meetings and joint mapping exercises elicited local landscape classification and terminology, provided a basis for biodiversity field surveys, and were iteratively revised and clarified. The exercise demonstrated a conservation approach that might build on the needs and priorities of local communities (Sheil *et al.* 2006).

Research efforts of this kind have been slow to influence conservation organisations, and approaches making the knowledge and capacities of local people a starting point are still controversial. This is because they involve building first on local conservation values, which translate into poverty-relevant issues such food security, and only then exploring ways to synthesise these with global values (Baldauf 2020). Rights-based approaches to conservation are also just beginning to gain traction (Blomley and Walters 2019).

## REDD+ and PES initiatives

### REDD+

Results-based finance is the current cornerstone in the approach to REDD+, with a special focus on intermediate outputs to reduce deforestation and forest degradation.

Understanding better who is bearing the costs of REDD+ projects is critical in incentivizing outcomes which are both carbon effective and equitable (Wong *et al.* 2016).

A review of forty-five articles from recent scientific literature on REDD+ outcomes was conducted by Duchelle *et al.* (2018). (In that year, REDD+ projects were mostly to be found in Brazil, Colombia, Peru, Indonesia and Kenya.) In the articles reviewed, most REDD+ projects focus on local people – indeed, many bear a close resemblance to integrated conservation and development projects. There is a strong emphasis in several studies on the importance of a pro-poor approach to REDD+, to enhance effectiveness and to promote equity and social co-benefits. Recommendations include recognising community rights, land tenure clarification, promoting equity through small cash transfers to the poor, and the better combining of climate change mitigation and adaptation goals. There has also been a focus on creating or strengthening local governance institutions (Duchelle *et al.* 2018).

Articles focussing on the measurement of livelihood outcomes are much more numerous than those of carbon outcomes (though those that exist paint a moderately encouraging picture). REDD+ projects are extremely heterogeneous and there is as yet no adequate evaluation of REDD+ performance overall (Duchelle *et al.* 2018).

REDD+ has catalysed national dialogues highlighting the inequitable outcomes of business-as-usual forest management. In several countries, including Indonesia, such dialogues have strengthened the position of indigenous peoples and given them a voice in national policy arenas which they did not previously have (Seymour 2019). In the same way, IUCN’s multicountry project ‘Towards Pro-Poor REDD+’ moved debate decisively forward, both for the organisation itself, and for REDD+ dialogue in the countries concerned (Blomley and Walters 2019). Using rights-based approaches (RBAs), teams worked with the premise that a decent livelihood was such a right. In Uganda, Cameroon, Guatemala, and Ghana, women argued for better recognition of their investments in local-level forest activities which led in due course to the development of a national gender policy within government REDD+ programmes.



## PES

In 2014, Samii *et al.* undertook a detailed Systematic Review of the effects of PES on deforestation and poverty in low and middle-income countries. The database search returned 1382 articles, but only 20 met the review's criteria, cases being located in Costa Rica, China, Mexico and Mozambique. While the PES programmes reviewed did show reductions in deforestation rates, evidence on welfare outcomes was very limited. Qualitative data in the 20 studies suggested that forest conservation effects were worse in poorer areas, and that lack of institutional capacity to carry out PES was a limiting factor in many places. The review was unable to demonstrate any beneficial effects on poverty reduction (Samii *et al.* 2014),

Alix-Garcia *et al.* 2013 found that environmental impact was highest where poverty was low and poverty alleviation highest where risk of deforestation was low. Programs in Latin America where payments for hydrological services were involved were moderately effective at reducing deforestation but not particularly effective at alleviating poverty (Alix-Garcia and Wolff 2014).

China's huge sloping land PES scheme seems to show that though the scheme targeted the poorest areas, it did not successfully involve the poorest people within those areas (Ren *et al.* 2018). Finally, it is not clear how PES programs function in weak institutional settings, in particular in places where land tenure is ambiguous (Wunder 2008).

So PES programmes have not so far succeeded in simultaneously supporting environmental protection and in alleviating poverty. The best that can be said is that to the extent that PES programmes increase the hunt for off farm labour opportunities, it may be that they have an indirect antipoverty impact (Alix-Garcia and Wolff 2014). A recent Systematic Review of large numbers of PES programmes (Snilstveit *et al.* 2019) concludes that, though they are now also considered as potential engines for climate change mitigation, the effectiveness of both environmental and socio-economic outcomes continue to be questioned.

## Policy and Project interventions – summary

To summarise, the policy and project interventions examined in this entire section of the paper, which taken together cover hundreds of initiatives over at least a 40-year period, show at best only modest successes in livelihood improvement, and barely touch poverty reduction.

A recent survey, focussing on the evaluation of a wide range of donor forest interventions in low and middle-income countries, provides an invaluable Evidence Gap Map based on two decades of literature (Pirard *et al.* 2019). Protected areas are by far the most commonly reported on, followed by community-based management, PES and tenure reform. The review's main findings are as follows.

- Forest cover is much the most evaluated outcome of intervention success. Measuring forest cover is straightforward using remote sensing, and avoids the time-consuming collection of primary data. By contrast, evaluations of biodiversity and socio-economic

impacts require longer-term on-the-ground commitment and a broader combination of skills. Protected areas of course do have positive forest conservation impacts, though research is lacking so far on the efficiency of different subtypes – for instance strict protected areas versus those that tolerate some human activity.

- The three most evaluated intervention/outcome combinations, are protected areas, conservation based on local community practice (of growing interest in the conservation community), and PES managed by public authorities.
- Livelihoods have received more focus, since socio-economic aspects of conservation are increasingly seen by donors and practitioners as important for ethical reasons as well as success. But evidence for poverty reduction outcomes is scanty.
- Both the carbon and the forest cover outcomes of REDD+ interventions have, surprisingly, been less well studied than human well-being outcomes, where a strong interest in REDD+ social safeguards has been shown. It is not yet clear how far REDD+ interventions achieve climate change mitigation.
- Environmental and social trade-offs have rarely been monitored side by side from the start in any project, with the exception of investigations in a small number of PES interventions (Samii *et al.* 2014, Alix-Garcia *et al.* 2013).
- Though it is generally recognised that conservation in one place may lead to deforestation in another, conservation 'leakage' remains under-studied with only seven examples identified. The broader impacts of protected areas within larger landscapes are an essential future research topic.
- Methods for simplifying results and presenting them vividly for decision makers are urgent if received wisdom is to change. Evaluations need the quality that research centres and universities provide, but donors and governments need that information in a format for them to make better policy choices.

## THE TACTICS OF THE POOR – PATHWAYS OUT OF POVERTY?

There are no simple answers to questions about the conditions under which forests might help people to move out of poverty (Shyamsunder, *et al.* 2020). We now turn instead to the efforts people themselves have made to make an escape from poverty, using forests as one of a portfolio of livelihood resources.

### 1. Using forests as one part of a livelihood portfolio, and building on choices available

Sunderlin's work at CIFOR (Sunderlin *et al.* 2005, 2007, 2008) has shown how those in remote areas are unlikely to get out of poverty in one bound. Rather we need to understand how forests (among other resources) can help to move the



TABLE 2 *Relative remoteness and reliance on forest*

Location	Cash income %	Non-cash income %	%	Comments
Very remote: Baka pygmies, Mambele and Salapoumbe, Cameroon				
Cash: non-cash income split	30	70	100	Very high forest reliance for protein, vegetables, fruits, eaten at home and traded. Carbohydrates mainly obtained through trade.
Of which forest contribution	17	42	59	
About 10 km from a market town: Pensanom village, S W Ghana. Original forest owners in the cocoa belt				
Cash: non-cash income split	47	53	100	Forests important for fuelwood, protein, wide range of NTFPs.
Of which forest contribution	10	27	37	
Huayuan village, Miyun water catchment, about 80 km from Beijing, China				
Cash: non-cash income split	82	18	100	Most cash comes from household members working as labour migrants in Beijing, but a little from forest NTFPs provided for tourists. Fuelwood vital for home heating in winter.
Of which forest contribution	6	3	9	

Shepherd, 2012

chronically poor to the transient poor, and the transient poor to the non-poor. Rural incomes are generally made up of cash and consumption forest income, cash and consumption farm income, and off-farm income, and the balance of income derived from these sources usually has to change before poverty reduction can take place. The ingenuity of rural producers in adapting livelihood strategies to new opportunities over long periods of time is well documented by Tiffen (1976, 1994) and this is no less true in a forest context. Changes such as gradually improving market access or employment availability slowly reduce forest reliance. Using relative landscape remoteness as a proxy for change over time (Chomitz 2007) it is possible to see a very clear pattern, in which rural people gradually reduce their forest reliance as agriculture and off-farm income sources become more profitable or more available.

Most farming systems were originally built upon synergy with forests, and forest income continues to work with agricultural income in various ways: making up shortfalls, releasing a greater proportion of agricultural produce for sale or enabling the keeping of more animals for capital investment through fodder provision. Indeed, the catalytic value of forests in supporting an increase in the accumulation of other sources of income is still an under-researched area. Gradually, as new non-forest pathways out of poverty present themselves, cash income from forests may disappear entirely, though non-cash reliance on forests continues for much longer (Shepherd 2012).

## 2. The complex role played by NTFPs in livelihood advancement

NTFPS fulfil multiple functions in the lives of the poor (Shackleton and Pandey 2014). Direct household consumption is by far the most important of these for both the poor and the less poor. (Kaimowitz 2003, Babulo *et al.* 2009, Belcher

*et al.* 2005). Without them, many more people would fall into further poverty and become food insecure. NTFPs thus play a vital livelihood resilience role.

Secondly NTFPs are used to create capital assets for the household: housing, house furnishings, and productive farming and hunting equipment. Thirdly they supply needs which would otherwise have to be paid for, such as energy and medicinals, sparing precious cash resources for the things that only money can buy such as children's education, agricultural inputs and so on. NTFPs thus make important contributions to income indirectly, as well as directly (Rasul *et al.* 2008, Shackleton *et al.* 2007, 2008, Shackleton and Pandey 2014).

Finally, of course, NTFPs offer income generation, usually as supplementary income but sometimes as a primary, though usually modest, source of income (Babulo *et al.* 2009, Mahapatra *et al.* 2005, Shackleton *et al.* 2008). Each NTFP may be of fairly low value, but a wide range may be sold over the year. Some products such as fuelwood, chew-stick toothbrushes or wrapping leaves for use in markets, may have low unit value, but are sold in such vast quantities (Schure, Levang and Wiersum 2014, Falconer 1990), that small but steady contributions to overall income can be earned – and by both sexes.

## 3. The longer-term – investment in the future

Women in particular go to great trouble to increase the chances of their children eventually escaping from poverty, by investing in education (school fees and school uniforms) using forest sales. (Shackleton *et al.* 2007, 2008). In southern Cameroon, an increase in NTFP sales by women was noted before the start of each school term (Schreckenberg *et al.* 2002).

Wherever cattle can be raised, cash from the sale of forest products such as fuelwood or timber is invested by men

in livestock. Cattle and smaller livestock such as goats can rapidly help to multiply cash income and build capital assets in remote savanna forest areas, if droughts and wars do not intervene (Hesse and MacGregor 2006). Livestock live on forest savannah tree browse for most of the year (e.g. Barrow 1990, Mortimore and Adams 1999).

#### 4. *The role of forest in re-establishing livelihoods after major shocks*

In the Northern and Eastern Regions of Uganda, when eventually populations were free to leave IDP (internally displaced person) camps, the forest played a major role in livelihood reconstruction as households settled back into private life and begin to look for ways to invest for the future. Over and above 'normal' support provided by forest households in these regions were able to draw down substantial extra resources, to see them through the early resettlement period. Non-cash support was used to rebuild and restock homesteads, while fuelwood and building materials were sold to raise cash for livestock, seed, and tools (Shepherd, Kazoora and Müller 2012).

#### 5. *Adding value to forest through enrichment and diversification*

In tropical moist forests where forest fallows are important in the agricultural cycle, a field about to be fallowed is often enriched by being planted up with economic fruit trees. Over time, villagers' fallowing farm plots turned into high value orchards under which some crops can still be grown. This has been a common pattern throughout South-East Asia, as multi-storey forest gardens testify. (Ziegler *et al.* 2011). Manipulation of forest composition to increase value is also well attested for the Amazon rainforest (Barlow *et al.* 2012). Around Mount Cameroon, forest is modified as part of the shifting cultivation cycle so that in some plots highly valued forest trees such as *Irvingia gabonensis* are moved as wildings and gradually clustered in accessible orchards. In other plots fallows alternate between agriculture and the forest regrowth which restores fertility, while in still others cultivation is almost continuous (Brocklesby and Ambrose-Oji 1997).

On the volcanic island of Anjouan in the Comoro Islands near Madagascar, efforts at poverty reduction have resulted in the conversion of the lower reaches of mountain forests almost entirely into agroforestry areas combining high value tree-crops – cloves and ylang-ylang – with domestic fruit trees such as mango and breadfruit, only the most highly valued indigenous timber species being retained (Shepherd *et al.* 2019). Such manipulation of the composition of forests greatly raises its value to owners. Ideally upper mountain slopes remain well-clothed in natural forest, and forest functions (such as protection of water sources) are thus also maintained.

#### 6. *Migration*

The tactics listed so far are all concerned with making the best use of forest resources, among others, first to build livelihood resilience and then to seek ways of reducing poverty in the

household. A more radical but increasingly common solution is for one or more members of the household to migrate, seasonally or for the longer term, to raise cash for the household left behind. In this case the forest may play a role in helping part-families survive tough times at home while key household members seek livelihood diversification elsewhere (de Sherbinin *et al.* 2008, Cohen, J.H. 2011). Hecht *et al.* (2015) note the importance of migration not only for the households concerned, but also for its impact on forest. Depending on household strategies as a whole, forest may begin to disappear if migration stokes agricultural expansion, or may regenerate if labour-short households abandon remoter fields.

In the Middle Hills of Nepal, labour migrants to the Middle East and Malaysia leave in their thousands. A recent study (Adhikari and Hobley 2015) investigated the impact of migration on two villages where 51–71% of households had a migrant member. Remittances in the district totalled \$26 million in 2010–2011. Initially, remittances are used to repay airfare loans. Subsequently, money is invested in children's education, house improvements and land purchase. Hitherto landless wage laborers buy land as wealthier families migrate from the Middle Hills to the Terai. Forests are managed less intensively and agriculture practised less intensively but more trees are planted on private land.

#### 7. *Small forest enterprises (SFEs)*

Finally, in somewhat less remote areas, where there is still plenty of forest but where also markets can be accessed, small forest enterprises (SFEs) are flourishing. SFEs typically contain only 2–6 employees, often recruited from among family members or co-villagers. Macqueen (2008) and Kozak (2007) argue that SFEs offer better prospects for poverty reduction than medium-sized enterprises or Community Forest Enterprises, and observe that the growth of small SFEs is outpacing that of larger enterprises everywhere, avoiding many of their management complexities, and staying 'below the radar' as far as business registration is concerned (Saigal and Bose 2003). SFEs may work in chainsaw timber felling and milling, or small-scale carpentry, and in northern Ghana at least over 600,000 women were working in SFEs collecting and processing shea butter (Osei-Tutu 2010). Indeed 77% of SFE proprietors in northern Ghana were women.

SFEs have the potential to enhance rural livelihoods since they may require little initial investment yet greatly diversify economic opportunities. Macqueen *et al.* (2020) suggest that such small forest businesses will play a key role in shaping the future of forest landscapes.

It is very difficult to estimate the total number of people working in SFEs worldwide, but it is large. Macqueen (2008) and Shackleton *et al.* (2011) suggest the figure is over 45 million. The World Bank (2016) estimates that there are 13.2 formal sector workers and up to 41 million informal sector workers. Kozak (2007) thinks SFEs may actually employ as many as 140 million people, if all informal forest sector enterprises are included.

## CONCLUSIONS: PRIORITIES FOR THE FUTURE

Much of the world about which John Spears and his colleagues were writing in the 1980s has changed almost beyond recognition. It has changed especially for the urban poor and for the non-remote rural poor (the transient poor). But it has changed much less for the chronic poor, living in relatively remote forested areas in parts of Africa and South and Southeast Asia.

As the first section of this paper shows, we now have a much greater understanding of the lives of poor people in forests. CIFOR's PEN results in particular, have enormously illuminated this relationship. It has become clear that reliance on forests – for cash income but above all for subsistence income – is far more profound than was originally realised, especially in the remoter areas where extensive forests are found.

Many aid interventions in the 1990s, and for while thereafter, focused on poverty reduction, and thus in the forest sector on the relationship between forests and poverty, at a time when CIFOR's data was not yet available. As a result, there was a primary focus on helping local people to generate cash incomes from forest, and a serious under-recognition of the role of forests as a steady supplier of the subsistence income which builds livelihood resilience for poor people.

But then for much of the next 18 years to the present, forestry donors have focused, rather, on forest interventions which are concerned with climate change mitigation, payments for environmental services and better forest sector governance. Pirard (2019) shows that the most evaluated aspect of all these projects is forest cover, though Oldekop *et al.* (2019)'s review does also go wider to consider poverty reduction as well.

Paradoxically livelihoods have received more focus in protected area projects over the last decade or more than ever before, partly because donors and practitioners are more concerned than they were with local people for ethical reasons, and partly because it is increasingly clear that conservation cannot work without their goodwill. The near universal commitment to the SDGs, which intertwine goals for poverty reduction, environmental protection and justice (Katila *et al.* 2019) are also important in this context. Nevertheless, there is a long way to go before poverty reduction is likely to occur in protected areas.

The forest-reliant poor themselves find their own means to escape, little by little, from poverty.

From those insights, two other themes emerge. Firstly, the assurance of livelihood security and resilience is the primary function of forests as far as poor people in forested areas are concerned. Out of that reliance, in certain circumstances, poverty reduction may be constructed. That this absolutely vital forest function was under-observed and under-recognised for so long was the result of the failure to measure the consumption values of forest as well as its cash values.

Secondly, the corollary to this is that great damage can be done to people living in remote forested rural areas if the protective underpinning to livelihoods provided by forests is removed. If that reliance on forest cannot be guaranteed, then rural people can rapidly fall into much greater poverty

(Shackleton and Pandey 2014). Poverty may similarly be increased in forests where land conversion removes resources from poor people. In Chile, for instance, large-scale private plantations drove people out from rural areas (Andersson *et al.* 2016).

Government allocation of forest to protected areas or logging concessions may have the same effect for those who abruptly lose access to resources they previously relied on. This has been widely reported from Cameroon and the Congo basin, for instance, where pygmies have been driven out of the forests they had lived in for centuries (e.g. Lewis 2005) by conservation organisations.

Future projects and programmes will need to make intervention choices which keep all that is now known about the role of forests in the lives of the poor, more clearly in view. And much more attention to baselines, monitoring, and targeted intervention will be required.

Climate change could actually give forests renewed importance for the poor. Recent research (Wunder *et al.* 2018) shows that climate-change related fluctuations in crop production and income may be tipping livelihood strategies back towards forests in many lower- and middle-income countries.

In terms of research there is still a need to understand longer-term strategies better, and the differing pathways out of poverty that men and women may take. (Women start from a position of greater forest reliance and fewer rights, for instance. Colfer *et al.* 2016). Panel data offers one solution (Miller and Hajjar 2020). Or a simpler research method may be to apply the predictive proxy indicators promoted by Miller *et al.* (2017). As these authors point out, much more is currently known about spatial aspects of poverty than about temporal aspects.

But above all, as Pirard *et al.* (2019) make clear, donors and governments need information presented to them in a format which is simple, compelling, and which leads to action. They need to understand that reliance on forests – for cash income but above all for subsistence income – is far more profound for many people than was originally realised, especially in the remoter areas where extensive forests are found. Without making changes to accommodate that reality, forestry interventions are likely to fail and the poor will grow poorer.

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## REFERENCES

- ADHIKARI, A., JHAVERI, N., KARKI, N., and PAUDEL, N.S. 2019. *Analysing the investment effects of forest rights devolution in Nepal's community-managed forest enterprises*. Working paper 254, CIFOR, Bogor, Indonesia.



- ADHIKARI, J. and HOBLEY, M. 2015. Everyone is leaving. Who will sow our fields? *Himalaya, the Journal of the Association for Nepal and Himalayan Studies*. Volume **35**, no.1, Article 7.
- AGRAWAL, A., CASHORE, B., HARDIN, R., SHEPHERD, G., BENSON, C., and MILLER, D. 2013. Economic contributions of forests. Commissioned Background Paper, *United Nations Forum on Forests*, 10<sup>th</sup> session.
- ALIX-GARCIA, J.M., MCINTOSH, C., SIMS, K.R.E., and WELCH, J.R. 2013. *Review of Economics and Statistics* **95**(2): 417–4, answer 35.
- ALIX-GARCIA, J.M., and WOLFF, H. 2014. Payment for ecosystems services from forests. *Annual review of Resource Economics* **6**: 361–380.
- ANDERSON, J., MEHTA, S., EPELU, E., and COHEN, B. 2015. Managing leftovers: does community forestry increase secure and equitable access to valuable resources for the rural poor? *Forest Policy and Economics* vol **58**, September 2015.
- ANDERSSON, K., LAWRENCE, D., ZAVALATA, J., and GUARIGUATA, M.R. 2016. More trees, more poverty? The socio-economic effects of tree plantations in Chile, 2001–2011. *Environmental Management* **57**(1): 123–136.
- ANGELSEN, A., and WUNDER, S. 2003. Exploring the Forest-Poverty-Link: key concepts, issues and research implications. *CIFOR Occasional Paper No.40*.
- ANGELSEN, A., JAGGER, P., BABIGUMIRA, R., BELCHER, B., HOGARTH, N.J., BAUCH, S., BORNER, J., SMITH-HALL, C., and WUNDER, S. 2014. Environmental Income and Rural Livelihoods: A Global-Comparative Analysis. *World Development* **64**: S12–S28.
- ARNOLD, J.E.M. 2001a. Forestry, Poverty and Aid. *CIFOR Occasional paper No. 33*. CIFOR, Bogor, Indonesia.
- CUSTOMERS ARNOLD, J.E.M. 2001b. *25 years of Community Forestry*. FAO, Rome, Italy.
- ARNOLD, J.E.M. 2004. Forward to *Forest products, livelihoods and conservation. Case studies of non-timber forest products systems*. CIFOR, Bogor Indonesia.
- ARNOLD, J.E.M., and PERSSON, R. 2009. Reorienting forestry development strategies in the 1970s towards 'Forests for People'. *International Forestry Review* **11**(1).
- BABULO, B., MUYS, B., TRICKED OUT NEGA, F., TOLLENS, E., NYSSON, J., DECKERS, J., MATHIJS, E. 2009. The economic contribution of forest resource use to rural livelihoods in Tigray Northern Ethiopia. *Forest Policy and Economics* **11**: 109–117.
- BAKKEGAARD, R.K., AGRAWAL, A., ANIMON, I., HOGARTH, N.J., MILLER, D., PERSHA, L., RAMET-STEINER, E., WUNDER, S. and ZEZZA, A. 2016. National socioeconomic surveys in forestry: Guidance and survey modules for measuring the multiple roles of forests in household welfare and livelihoods. *FAO Forestry Paper No. 179*. FAO, CIFOR, IFRI, and World Bank.
- BAKKEGAARD, R.K., HOGARTH, N.J., BONG, I.W., BOSSELMANN, A.S. and WUNDER, S. 2017. Measuring forest and wild product contributions to household welfare: Testing a scalable household survey instrument in Indonesia. In *Forest, Food, and Livelihoods*. Special edition. *Forest Policy and Economics* **84**: 1–8.
- BALDAUF, C. (ed). 2020. *Participatory biodiversity conservation. Concepts, experiences, and perspectives*. Springer Nature Switzerland A.G.
- BANERJEE, A. and DUFLO, E. 2011. *Poor Economics: A radical rethinking of the way to fight global poverty*. Public Affairs: New York.
- BARLOW, J., GARDNER, T., LEES, A., PARRY, L. and PERES, C. 2012. How pristine are tropical forests? An ecological perspective on the pre-Columbian human footprint in Amazonia and implications for contemporary conservation. *Biological Conservation* **151**: 45–49.
- BARROW, E. 1990. Usufruct rights to trees: the role of Ekwar in dryland central Turkana, Kenya. *Human Ecology* **18**(2).
- BAYNES, J., HERBOHN, J., SMITH, C., FISHER, R., and BRAY, D. 2015. Key factors which influence the success of community forestry in developing countries. *Global Environmental Change* **35**: 226–238.
- BELCHER, B., RUIZ-PEREZ, M., and ACHDIAWAN, R. 2005. Global patterns and trends in the use and management of commercial NTFPs: implications for livelihoods and conservation. *World Development* **33**(9).
- BIRD, K. HULME, D. MOORE, K. and SHEPHERD, A. 2002. Chronic poverty and Remote Rural Areas. *Chronic Poverty Research Centre, Working Paper Number 13*.
- BLOMLEY, T., and WALTERS, G. (eds) 2019. *A landscape for everyone: integrating rights-based and landscape governance approaches*. IUCN, Gland, Switzerland.
- BROCKLSBY, M., and AMBROSE-OJI, B. 1997. Neither the forest nor the farm. Livelihoods in the forest zone – the role of shifting agriculture on Mount Cameroon. *Rural Development Forestry Network*. Paper **21d**, ODI, London.
- BROWN, D., RICHARDS, M., SCHRECKENBERG, K., and SHEPHERD, G. 1999. Getting aid delivery right: host country, donor and international complementarity for greater aid effectiveness in the forest sector. *European Union Tropical Forestry Paper 4*. Overseas Development Institute, London and European Commission, Brussels.
- BUCHY, M., and HOBLEY, M. 2018 FLEGT and livelihoods. *CAB Reviews*. **13** No. 057
- CAVENDISH, W. 2003. How do forests support, insure and improve the livelihoods of the rural poor: a research note. *Center for International Forestry Research*, Bogor, Indonesia.
- CHENG, S.H., MACLEOD, K., AHLROTH, S., ONDER, S., PERGE, E., SHYAMSUNDAR, P., RANA, P., GARSIDE, R., KRISTJANSON, P., MCKINNON, M., and MILLER, D.C. 2019. A systematic map of evidence on the contribution of forests to poverty alleviation. *Environmental Evidence* **8**(3).
- CHOMITZ, K.M. 2007. At loggerheads? Agricultural expansion, poverty reduction, and environment in the tropical forests. *World Bank Group Policy Research Report*, Washington DC: World Bank.
- COLFER, C.J.P., BASNETT, B.S., and ELIAS, M. 2016. *Gender and forests: climate change, tenure value chains and emerging issues*. London: Earthscan, Routledge.
- COHEN, J.H. 2011. Migration, remittances and household strategies. *Annual Review of Anthropology* **40**.



- CPRC (CHRONIC POVERTY RESEARCH CENTRE) 2004. *The Chronic Poverty Report 2004–2005*. Institute for Development Policy and Management, University of Manchester, Manchester, UK.
- CURTIS, P., SLAY, C., HARRIS, N., TYUKAVINA, A., HANSEN, M. 2018. Classifying drivers of global forest loss. *Science* **361**(6407). September 2018.
- DEROUS, M., and VERHAEGHE, E. 2019. When the P stands for politics. The role of the EU in the VPAs: a research agenda. *Forest Policy and Economics* **101**: 81–87.
- DE SHERBANIN, A., VANWEY, L., MCSWEENEY, K., AGGARWAL, R., BARBIERI, A., HENRY, S., HUNTER, L., TWINE, W., and WALKER, R. 2008. Rural Household Demographics, livelihoods and the environment. *Global Environmental Change* **18**.
- DOLSAK, N., and OSTROM, E. (eds). 2003. *The Commons in the New Millennium: Challenges and Adaptations*. Cambridge, MA: MIT Press.
- DUHELLE, A., SIMONET, G., SUNDERLIN, W., and WUNDER, S. 2018. What is REDD+ achieving on the ground? *Current Opinion in Environmental Sustainability* **32**: 134–140.
- DRESSLER, W., BUSCHER, B., SCHOON, M., BROCKINGTON, D., HAYES, T. KULL, C., MCCARTHY, J. and STRESTHA, K. 2010. From Hope to Crisis and Back Again? A Critical History of the Global CBNRM Narrative. *Environmental Conservation* **37**(1): 5–15.
- EUROPEAN COMMISSION. 2003. Forest Law Enforcement, Governance and Trade (FLEGT). *Proposal for an EU action plan* (COM/2003/0251 final).
- FALCONER, J. 1990. The major significance of ‘minor’ forest products. The local use and value of forests in the West African humid forest zone. *Community Forestry Note* No 6. FAO, Rome, Italy.
- FAO (FOOD AND AGRICULTURE ORGANISATION OF THE UNITED NATIONS), 2018. *State of the World's Forests 2018: Forest pathways to sustainable development*. Rome, Italy.
- FOUNDJEM-TITA, D., DUGUMA, L.A., SPEELMAN, S., and PIABUO, S.M. 2018. Viability of community forests as social enterprises: A Cameroon case study. *Ecology and Society* **23**(4): 50.
- GARCIA-AMADO, L.R., PEREZ, M.R. and GARCIA, S.B., 2013. Motivation for conservation: Assessing integrated conservation and development projects and payments for environmental services in La Sepultura Biosphere Reserve, Chiapas, Mexico. *Ecological Economics* **89**: 92–100.
- HAJJAR, R. and OLDEKOP, J.A. 2018. Research frontiers in community forest management. *Current Opinion in Environment Sustainability* **32**: 119–125.
- HECHT, S., TANG, A., BASNETT, B., PADOCH, C., PELUSO, N. 2015. People in motion, forests in transition: trends in migration, urbanisation, and remittances and their effects on tropical forests. *CIFOR Occasional Paper* **142**. CIFOR, Bogor, Indonesia.
- HESSE, C., and MACGREGOR, J. 2006. *Pastoralism: drylands' invisible asset?* Issue paper no.142. International Institute for Environment and Development, London.
- HOBLEY, M. 1991. From passive to active participatory forestry: Nepal. In *Projects with People: The Practice of Participation in Rural Development*. P. Oakley, World Employment Programme, ILO Geneva.
- HOBLEY, M. 1996. Participatory forestry: the process of change in India and Nepal. *Rural Development Forestry Study Guide*. Overseas Development Institute, London.
- HOBLEY, M., and BUCHY, M. 2013. How can a VPA contribute to poverty reduction? *FLEGT in Action* No. 3, EU FLEGT Facility, European Forest Institute, Joensuu, Finland.
- HOBLEY, M., JHA, C. and POUDEL, K. 2012. *Persistence and Change: review of 30 years of community forestry in Nepal*. Multi Stakeholder Forestry Programme (MSFP). Lalitpur, Nepal. [https://www.researchgate.net/publication/282287096\\_Persistence\\_and\\_change\\_review\\_of\\_30\\_years\\_of\\_community\\_forestry\\_in\\_Nepal/link/560a7b9a08ae1396914bd62d/download](https://www.researchgate.net/publication/282287096_Persistence_and_change_review_of_30_years_of_community_forestry_in_Nepal/link/560a7b9a08ae1396914bd62d/download)
- HOGARTH, N., BELCHER, B., CAMPBELL, B., and STACEY, N. 2013. The role of forest -related income in household economies and rural livelihoods in the border region of Southern China. *World Development* Vol. **43**.
- HULME, D. and SHEPHERD, A. (eds) 2003. Special issue on Chronic Poverty and Development Policy. *World Development* **31**(3), Washington USA.
- JAGGER, P., LUCKERT, M., DUHELLE, A., LUND, J., and SUNDERLIN, W. 2014 Tenure and forest income: observations from a global study on forests and poverty. *World Development* **64**: S43–S55.
- KAIMOWITZ, D. 2003. Not by bread alone. Forests and rural livelihoods in sub-Saharan Africa in Oksanen, T., Pajari, B., Tuomasjukka, (eds). *Forestry in poverty reduction strategies: capturing the potential*. EFI Proceedings, No 47. European Forest Institute, Joensuu.
- KAMANGA, P., VEDELD, P., and SJAASTAD, E. 2009. Forest incomes and rural livelihoods in Chiradzulu District, Malawi. *Ecological Economics* **68**(3): 613–624.
- KANBUR, R., and VENABLES, A.J. (eds) 2005. *Spatial Inequality and Development* Oxford University Press, Oxford, UK.
- KATILA, P., COLFER, C., DE JONG, W., GALLOWAY, G., PACHECO, P., and WINKEL, G. 2019. *Sustainable development goals: their impacts on forests and people*. Cambridge University Press, Cambridge, UK.
- KOZAK, R. 2007. *Small and Medium Forest Enterprises: Instruments of Change in the Developing World*. Rights and Resources Initiative, Washington, USA.
- KUSTERS, K., and BELCHER, B. Eds. 2004. *Forest products, livelihoods and conservation. Case studies of non-timber forest products systems*. Volume 1 – Asia. CIFOR, Bogor Indonesia.
- LESNIEWSKA, F., and MCDERMOTT, C. 2014. FLEGT VPAs: laying a pathway to sustainability via legality. Lessons from Ghana and Indonesia. *Forest policy and economics* **48**: 16–23.

- LEWIS, J. 2005. Whose forest is it anyway? Mbendjele Yaka pygmies, the Ndoki forest and the wider world. In *Encapsulation, Commercialisation, Discrimination. Property and Equality vol 2*. Widlok, T., and Tadesse, W., G. Berghahn Books: New York and Oxford.
- MACQUEEN, D. 2008. Forest Connect: reducing poverty and deforestation through support to community forest enterprises. *International Forest Review* **10**: 670–675.
- MACQUEEN, D. 2013. Enabling conditions for successful community forest enterprises. *Small-scale Forestry* **12**(1): 145–163.
- MACQUEEN, D., BOLIN, A., GREIJMANS, M., GROUWELS, S., HUMPHRIES, S. 2020. Innovations towards prosperity emerging in locally controlled forest business models and prospects for scaling up. *World Development* **125**.
- MAHAPATRA, A., SHACKLETON, C. 2011. Has deregulation of nontimber forest products controls and marketing in India affected local livelihoods? *Forest Policy and Economics* **13**: 622–629.
- MAMO, G., SJAASTAD, E., and VEDELD, P. 2007. Economic dependence on forest resources: A case from Dendi District, Ethiopia. *Forest Policy and Economics* **9**: 916–927.
- MCDERMOTT, M.H., and SCHRECKENBERG, K. 2009. Equity in community forestry: insights from North and South. *International Forestry Review* **11**(2).
- MCSHANE, T. and Wells, M. 2004. *Getting biodiversity projects to work: towards more effective conservation and development*. Biology and Resource Management Series. Columbia University Press.
- MILLER, D.C., RANA, P., and WAHLÉN, C.B. 2017. A crystal ball for forests? Analyzing the social-ecological impacts of forest conservation and management over the long term. *Environment and Society: Advances in Research* **8**: 40–62 Berghahn Books.
- MILLER, D.C., and HAJJAR, R. 2020. Forests as pathways to prosperity: empirical insights and conceptual advances. *World Development* **125**.
- MORTIMORE, M., and ADAM, W. 1999. *Working the Sahel. Global Environmental Change Programme*. Routledge, London and New York.
- MÜLLER, D. and SENF, C. 2010. *Global spatial associations of forests and poverty: analysis of 27 country cases*. Background document prepared for FAO-FRA 2010 Thematic study Forests, poverty and livelihoods. Humboldt University, Berlin and the Liebniz Institute of Agricultural Development. Halle Germany.
- NATIONAL ACADEMY OF SCIENCES. 1986. Proceedings of the conference on common property resource management. Office of International affairs, National Research Council. *National Academy press*. Washington DC.
- NEUMANN, R.P. 2002. *Imposing Wilderness: Struggles over Livelihood and Nature Preservation in Africa*. University of California Press.
- NIELSEN, M.R., POULIOT, M., and BAKKEGAARD, R.K. 2012. Combining income and assets measures to include the transitory nature of poverty in assessments of forest dependence: evidence from the Democratic Republic of Congo *Ecological Economics* **78**: 37–46.
- OLDEKOP, J., SIMS, K., KARNA, B. WHITTINGHAM, M., and AGRAWAL, A. 2019. Reductions in deforestation and poverty from decentralised forest management in Nepal. *Nature sustainability* **2**: 421–428.
- OSEI-TUTU, P., NKETIAH, K., KYEREH, B., OWUSU-ANSAH, M., FANIYAN, J. 2010. Hidden forestry revealed: Characteristics, constraints and opportunities for small and medium forest enterprises in Ghana. *IIED Small and Medium Forest Enterprise Series No 27*. Tropenbos International and International Institute for Environment and Development, London, UK.
- OWUSU, B., NKETIAH, K.S., AGGREY, J., and WIERSUM, F. 2010. Timber legality, local livelihoods and social safeguards: implications of FLEGT/VPA in Ghana. Proceedings of a workshop in Kumasi. *Tropenbos International Ghana*.
- PARAJULI, R., LAMICHHANE, D. and JOSHI, O. 2015. Does Nepal's community forestry program improve the rural household economy? A cost-benefit analysis of community forestry user groups in Kaski and Syangja districts of Nepal. *Journal of Forest Research* **20**(6): 475–483.
- PIRARD, R., WUNDER, S., DUCHELLE, A., PURI, J., ASFAW, S., BULUSU, M., PETIT, H., and VEDOVETO, M. 2019. Effectiveness of forest conservation interventions: an evidence gap map. *Independent Evaluation Unit Learning Paper No 2* Green Climate Fund, Incheon, Republic of Korea.
- POKORNY, B. and JOHNSON, J. 2008. Community Forestry in the Amazon: the unsolved challenge of forests and the poor. *Natural Resources Perspectives* **112**. ODI London.
- RASUL, G., KARKI, M., and SAH, R. 2008. The role of nontimber forest products in poverty reduction in India: prospects and problems. *Development in practice* **18**: 779–788.
- REN, L., LI, J., LI, C., LI, S. and DAILY, G.C. 2018. Does Poverty Matter in Payment for Ecosystem Services Programs? Participation in the New Stage Sloping Land Conversion Program. *Sustainability* **10**: 1888.
- ROE, D., BOOKER, F., DAY, M., ZHOU, W., ALLEBONE-WEBB, S., HILL, N., KUMPEL, N., PETROKOFKY, G., REDFORD, K., RUSSELL, D., SHEPHERD, G., WRIGHT, J., and SUNDERLAND, T. 2015. Are alternative livelihood projects effective at reducing local threats to specified elements of biodiversity and/or improving or maintaining the conservation status of those elements? *Environmental Evidence* **4**: 22.
- SAIGAL, S., and BOSE, S. 2003. Small-scale Forestry Enterprise in India. *Small and Medium Forest Enterprises Series*, No. **6**, Winrock International India (WII) and International Institute for Environment and Development (IIED), London, UK.
- SAMII, C., LISIECKI, M., KULKARNI, P., PALER, L., and CHAVIS, L. 2014. Effects of payment for environmental services (PES) on deforestation and poverty in low and middle income countries: a Systematic Review. *Campbell Systematic Reviews* **10**(1): 11.

- SAYER, J., CAMPBELL, B., PETHERAM, E., ALDRICH, M., PEREZ, M.R., ENDAMANA, D., DONGMO, Z.I.N., DEFO, L., MARIKI, S., DOGGART, N. and BURGESS, N. 2007. Assessing environment and development outcomes in conservation landscapes. *Biodiversity and Conservation* **16**(9): 2677–2694.
- SCHRECKENBERG, K., DEGRANDE, A., MBOSSO, C., EOLI BABOULE, Z., BOYD, C., ENYONG, J., KANMEGNE, J., and NGONG, C. 2002. The social and economic importance of *Dacryodes edulis* in southern Cameroon. *Journal of Forests, Trees and Livelihoods* **12**(2): 15–40.
- SCHURE, J., LEVANG, P., and WIERSUM, F. 2014. Producing woodfuel for urban centres in the Democratic Republic of Congo: a path out of poverty for rural households? *World Development* **64S**.
- SETYOWATIA, A., and MCDERMOTT, C. 2017. Commodifying legality? Who and what counts as legal in the Indonesian wood trade. *Society and natural resources* **34**(6).
- SEYMOUR, F. 2019. Looking back, looking forward: REDD+. <https://nature4climate.org/news/frances-seymour-looking-back-at-redd-and-looking-forward-on-the-finance-gap/>
- SHACKLETON, C., SHACKLETON, S., BUITEN, E., and BIRD, N. 2007. The importance of dry forests and woodlands in rural livelihoods and poverty alleviation in South Africa. *Forest policy and Economics* **9**: 558–577.
- SHACKLETON, C., SHACKLETON S., and SHANLEY, P. 2011. *Non Timber Forest Products in the Global Context*. Tropical Forestry. Berlin, Springer-Verlag.
- SHACKLETON, C., and PANDEY, A. 2014. Positioning nontimber forest products on the development agenda. *Forest Policy and Economics* **38**.
- SHACKLETON, S., CAMPBELL, B., LOTZ-SISITKA, H., and SHACKLETON, C. 2008. Links between the local trading natural products, livelihoods and poverty alleviation in a semiarid region of South Africa. *World Development* **36**.
- SHEIL, G., PURI, R., WAN, M., BASUKI, I., VAN HEIST, M., LISWANTI, N., RUKMIYATI, RACHMATIKA, I., and SAMSOEDIN, I. 2006. Recognizing local people's priorities for tropical forest biodiversity. *Ambio* **35**(1).
- SHEPHERD, G. 1990. Forestry, Social Forestry, Fuelwood and the Environment: a tour of the horizon. *Social Forestry Network*, Paper **11a**. Overseas Development Institute, London.
- SHEPHERD, G. 2012. Rethinking forest reliance: findings about poverty, livelihood resilience and forests from IUCN's Livelihoods and Landscapes strategy. *Landscape Papers* **1**. IUCN, Gland Switzerland.
- SHEPHERD, G., KAZOORA, C., and MÜLLER, D. 2012. *Forests, Livelihoods and Poverty Alleviation: the case of Uganda*. FAO, Rome.
- SHEPHERD, G., MOHAMED, M., MOHAMADI, N. and DOULTON, H. 2019. Wood utilization in the Moya region of Anjouan, Comoro Islands: volume, value and implications for biodiversity. *Critical Ecosystems Partnership Fund*, Arlington Virginia USA.
- SHYAMSUNDAR, P., AHLROTH, S.E., KRISTJANSON, P.M., and ONDER, S. 2018. Understanding forests' contribution to poverty alleviation: a framework for interventions in forested areas (English). *Policy Research Working Paper*; no. WPS 8462. Washington, D.C.: World Bank Group.
- SHYAMSUNDER, P., AHLROTH, S., KRISTJANSON, P., and ONDER, S. 2020. Supporting pathways to prosperity in forest landscapes – a PRIME framework. *World Development* **125**.
- SNILSVEIT, B., STEVENSON, J., LANGER, L., DA SILVA, N., RABAT, Z., NDUKU, P., POLANIN, J., SHEMITT, I., EYERS, J., and FERRARO, P. 2019. Incentives for climate mitigation in the land use sector – the effects of payment for environmental services (PES) on environmental and socio-economic outcomes in low- and middle-income countries: a mixed method systematic review. *3ie Systematic Review* **44**. London: International Initiative for Impact Evaluation.
- STOIAN, D., DONOVAN, J., and POOLE, N. 2009. Unlocking the development potential of community forest enterprises: findings from a comparative study in Asia, Africa, Latin America, and the United States. *XIII World Forestry Congress, 18–23 October 2009*, Buenos Aires, Argentina.
- SUNDERLAND, T., and NDOYE, O. (eds). 2004. *Forest products, livelihoods and conservation. Case studies of non-timber forest products systems*. Volume **2** – Africa. CIFOR, Bogor Indonesia.
- SUNDERLAND, T., ACHDIAWAN, R., ANGELSEN, A., BABIGUMIRA, R., ICKOWITZ, A., PAUMGARTEN, F., REYES-GARCÍA, V. and SHIVELY, G. 2014. Challenging perceptions about men, women, and forest product use: a global comparative study. *World Development* **64**: S56–66.
- SUNDERLIN, W.D., ANGELSEN, A., BELCHER, B., NASI, R., SANTOSO, L. and WUNDER, S. 2005. Livelihoods, Forests and Conservation in Developing Countries: an Overview. *World Development* **33**(9), Washington, USA.
- SUNDERLIN, W.D., DEWI, S., and PUNTODEWO, A. 2007. Poverty and Forests: Multicountry Analysis of Spatial Association and Proposed Policy Solutions. *CIFOR Occasional paper* no **47**. Center for International Forestry Research, Bogor Indonesia.
- SUNDERLIN, W.D., DEWI, S., PUNTODEWO, A., MÜLLER, D., ANGELSEN, A., and EPPRECHT, M. 2008. Why forests are important for global poverty alleviation: a spatial explanation. *Ecology and Society* **13**(2): 24. [online] URL:
- SUSTAINABLE DEVELOPMENT GOALS (SDG) website <https://sustainabledevelopment.un.org/>
- THOMS, C. 2006. Conservation success, livelihoods failure? Community forestry in Nepal. *Policy matters* **14**: 169–179.
- TIFFEN, M. 1976. *The enterprising peasant: a study of economic development in Gombe Emirate, north-eastern state 1900–1968, Nigeria*. Her Majesty's Stationery office, London.



- TIFFEN, M., MORTIMORE, M., and GICHUKI, F. 1994. *More people, less erosion: environmental recovery in Kenya*. Wiley, UK and USA.
- VAN HEESWIJK, L., and TURNHOUT, E. 2013. The discursive structure of FLEGT (Forest Law Enforcement, Governance and Trade): the negotiation and interpretation of legality in the EU and Indonesia. *Forest policy and economics* **32**: 6–13.
- VEDELD, P., ANGELSEN, A., SJAASTAD, E., and BERG, G.K. 2004. Counting on the environment: Forest income and the rural poor. *Environmental Economics Series No. 98*. The World Bank: Washington, D.C.
- WARNER, K. 2006. Big Trees for Little People: Managing forests for poverty reduction. In *A Cut for the Poor. Proceedings of the International Conference on Managing Forests for Poverty Reduction: Capturing Opportunities in Forest Harvesting and Wood Processing for the Benefit of the Poor*. (eds) Oberndorf, R., Durst, P., Mahanty, S., Burslem, K. and Suzuki, R. Ho Chi Minh City, Vietnam, 306 October 2006.
- WEBER, J., SILLS, E.O., BAUCH, S. and PATTAN, S.K. 2011. Do ICDPs Work? An Empirical Evaluation of Forest-Based Microenterprises in the Brazilian Amazon. *Land Economics* **87**(4).
- WONG, G., ANGELSEN, A., BROCKHAUS, M., CARMENTA, R., DUCHELLE, A., LEONARD, S., LUTTRELL, C., MARTIUS, C., and WUNDER, S. 2016. Results-based payments for REDD+: lessons on finance, performance and non-carbon benefits. *CIFOR Infobrief*, No **138**, May 2016.
- WORLD BANK. 1978. *Forestry Sector Policy paper*. February 1978. Washington DC, USA.
- WORLD BANK. 2016. Forests generate jobs and incomes. <http://www.worldbank.org/en/topic/forests/brief/forests-generate-jobs-and-incomes>
- WRIGHT, J.H., HILL, N., ROSE, D., ROWCLIFFE, M., KÜMPPEL, N., DAY, M., BOOKER, F., and MILNER-GULLAND, E.J. 2015. Reframing the concept of alternative livelihoods. *Conservation Biology* **30**(1): 7–13.
- WUNDER, S. 2001. Poverty alleviation and tropical forests – what scope for synergies? *World Development* **29**(11).
- WUNDER, S. 2008. Payments for environmental services and the poor: concepts and preliminary evidence. *Environment and Development Economics* **13**: 279–297.
- WUNDER, S., BÖRNER, J., SHIVELY, G. and WYMAN, M. 2014. Safety nets, gap filling and forests: a global-comparative perspective. *World Development* **64**: S29–S42.
- WUNDER, S., NOACK, F., and ANGELSEN, A. 2018. Climate, crops and forests: a pan tropical analysis of household income generation. *Environment and Development Economics* **23**: 279–297.
- ZIEGLER, A., FOX, J., WEBB, E., PADOCH, C., LEISZ, S., CRAMB, R., MERTZ, O., BRUUN, T., and VIEN, T. 2011. Recognizing contemporary roles of swidden agriculture in transforming landscapes of Southeast Asia. *Conservation Biology* **25**(4).